

IN THE CLAIMS:

Please amend claims 1, 3-5 and 9-12, and add new claims 18-28 as set forth in the following listing of claims. The listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently Amended) A method of forming a magnetic resonance image of an object to be examined, comprising the steps of:

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acquiring magnetic resonance signals,  
inserting a microcoil into the object being examined,  
determining the position of ~~a measuring site~~ the microcoil,  
determining a geometrical relationship between the ~~measuring~~  
~~site~~ position of the microcoil and the object being examined,  
reconstructing the magnetic resonance image from the  
acquired magnetic resonance signals and on the basis of the  
determined position of the ~~measuring site~~ microcoil,  
reproducing a detail of the object being examined and an  
indication of the ~~measuring site~~ position of the microcoil  
together in the magnetic resonance image, and  
deriving a correct position of the detail of the object  
being examined in the magnetic resonance image relative to the

indication of the ~~measuring site~~ position of the microcoil on the basis of the position of the indication of the ~~measuring site~~ position of the microcoil and the determined geometrical relationship between the ~~measuring site~~ position of the microcoil and the object being examined.

2. (Cancelled)

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3. (Currently Amended). A method of forming a magnetic resonance image as claimed in Claim 1 further comprising the steps of:

acquiring a set of measuring magnetic resonance signals at a reference temperature,

acquiring a set of measuring magnetic resonance signals after the temperature has been changed, notably increased, at the area of the ~~measuring site~~ microcoil,

deriving reference magnetic resonance image from the reference magnetic resonance signals,

deriving a measuring magnetic resonance image from the measuring magnetic resonance signals, and

making the measuring magnetic resonance image and the reference magnetic resonance image to register on the basis of the ~~position~~ determined position of ~~for the measuring site~~

microcoil.

4. (Currently Amended). A method of forming a magnetic resonance image as claimed in Claim 3 further comprising the step of:

on the basis of the ~~position~~ determined position of ~~for~~ the ~~measuring site~~ microcoil, acquiring the reference magnetic resonance signals and the measuring magnetic resonance signals from essentially the same region.

5. (Currently Amended). A method of forming a magnetic resonance image as claimed in Claim 3 further comprising the steps of:

reproducing a detail and an indication of the ~~measuring site~~ position of the microcoil in the reference magnetic resonance image,

reproducing the same detail and the indication of the ~~measuring site~~ position of the microcoil in the measuring magnetic resonance image, and wherein

a shift of the detail is derived from respective positions of the detail relative to the indication of the ~~measuring site~~ position of the microcoil in the reference magnetic resonance image and the measuring magnetic resonance image, correcting the

position of the detail in the measuring magnetic resonance image is corrected on the basis of the derived shift of the detail.

6-8. (Cancelled)

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9. (Currently Amended). A method as claimed in Claim 1 wherein the step of determining the position of the microcoil comprises the steps of:

positioning the [[a]] microcoil at a measuring site such that ~~is used to acquire~~ position magnetic resonance signals are produced by ~~at the area of~~ the microcoil, and

deriving the position of the ~~measuring site is derived~~ microcoil from the position magnetic resonance signals.

10. (Currently Amended). A magnetic resonance imaging system for forming a magnetic resonance image of an object to be examined comprising:

a microcoil insertable into the object being examined,

a coil system for acquiring magnetic resonance signals and for determining the position of ~~a measuring site~~ the microcoil in the object being examined,

a unit for the determination of a geometrical relationship between the ~~measuring site~~ position of the microcoil and the

object being examined, and

a reconstruction unit for the reconstruction of the magnetic resonance image from the acquired magnetic resonance imaging signals and the ~~position~~ determined ~~for~~ position of the ~~measuring site~~ microcoil, the reconstruction unit being arranged to reproduce a detail of the object being examined and an indication of the ~~measuring site~~ position of the microcoil together in the magnetic resonance image,

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a correct position of the detail of the object being examined in the magnetic resonance image relative to the indication of the ~~measuring site~~ position of the microcoil being derived on the basis of the position of the indication of the ~~measuring site~~ position of the microcoil and the determined geometrical relationship between the ~~measuring site~~ position of the microcoil and the object being examined.

11. (Currently Amended). A magnetic resonance imaging system as claimed in Claim 10 ~~further comprising: a~~ wherein the microcoil ~~for the acquisition of~~ is arranged to produce position magnetic resonance signals ~~at the area of the microcoil~~, and wherein

the reconstruction unit is arranged to derive the magnetic resonance image from the magnetic resonance signals and on the

basis of the position magnetic resonance signals.

12. (Currently Amended). A computer program which forms a magnetic resonance image of an object to be examined containing instructions for:

the acquisition of magnetic resonance signals, and

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the determination of the position of a ~~measuring site~~,  
microcoil,

the determination of a geometrical relationship between the ~~measuring site~~ microcoil and the object being examined,

the reconstruction of a magnetic resonance image from the magnetic resonance imaging signals and on the basis of the position of the ~~measuring site~~ microcoil,

the reproduction of a detail of the object being examined and an indication of the ~~measuring site~~ position of the microcoil together in the magnetic resonance image, and

the derivation of a correct position of the detail of the object being examined in the magnetic resonance image relative to the indication of the ~~measuring site~~ position of the microcoil on the basis of the position of the indication of the ~~measuring site~~ position of the microcoil and the determined geometrical relationship between the ~~measuring site~~ position of the microcoil and the object being examined.

13-17. (Canceled)

18. (New). A method of forming a magnetic resonance image as claimed in Claim 1, further comprising the steps of:

acquiring reference magnetic resonance signals at a reference temperature,

increasing the temperature in an area proximate the microcoil,

then acquiring measuring magnetic resonance signals after the temperature in the area proximate the microcoil has been increased,

reconstructing a reference magnetic resonance image from the reference magnetic resonance signals,

reconstructing a measuring magnetic resonance image from the measuring magnetic resonance signals,

determining a temperature dependent chemical shift upon comparison of the measuring magnetic resonance signals to the reference magnetic resonance signals, and

determining a location variation in temperature on the basis of the temperature dependent chemical shift.

19. (New) A method of forming a magnetic resonance image as claimed in Claim 18, wherein an indication of the position of the

measuring site is reproduced in the reference magnetic resonance image and in the measuring magnetic resonance image.

20. (New) A method of forming a magnetic resonance image as claimed in Claim 18, further comprising the step of:

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using an energy-dissipating element in conjunction with the microcoil to provide for the increase in temperature in the area proximate the microcoil.

21. (New) A method of forming a magnetic resonance image as claimed in Claim 18, further comprising the step of:

arranging an energy-dissipating element near the microcoil to provide for the increase in temperature in the area proximate the microcoil.

22. (New) A method of forming a magnetic resonance image as claimed in Claim 18, further comprising the steps of:

inserting an additional microcoil into the object being examined, and

measuring the position and direction of a line through the microcoils.

23. (New) A method of forming a magnetic resonance image as



claimed in Claim 18, further comprising the steps of:

inserting two additional microcoils into the object being examined such that all three microcoils are not on the same line, and

measuring the position and orientation of a plane through the microcoils.

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24. (New) A method of forming a magnetic resonance image as claimed in Claim 1, further comprising the steps of:

mounting the microcoil on an interventional instrument.

25. (New) A method of forming a magnetic resonance image as claimed in Claim 1, further comprising the step of:

mounting the microcoil on a catheter.

26. (New) A method of forming a magnetic resonance image as claimed in Claim 1, wherein the geometrical relationship between the position of the microcoil and the object being examined is determined such that upon movement of the object being examined, an adjusted position of the microcoil is determinable.

27. (New) A magnetic resonance imaging system as claimed in Claim 10, wherein the microcoil is mounted on an interventional

instrument.

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28. (New) A magnetic resonance imaging system as claimed in Claim 27, wherein the interventional instrument includes a temperature sensor for measuring local temperature and the microcoil produces position magnetic resonance signals, the reconstruction unit being arranged to reconstruct a temperature distribution in form of at least one thermal image on the basis of the temperature measured by the temperature sensor, the position magnetic resonance signals and the acquired magnetic resonance signals.

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